The 2002-2003 Student Learning Outcomes Report

Rio Salado College

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General Education Program

Executive Summary

Rio Salado general education learning outcomes highlights are as follows:

- Students scored within the acceptable range of college-level performance[1] on writing, reading, information literacy and problem solving.

- The AP was administered to 224 Rio Salado students as a multiple measure. Rio Salado students had a higher mean on all sections of the test than the appropriate comparison group that consists of community college freshman. The distance learning and dual enrollment cohorts scored at the 97th percentile against the freshman comparison group and the graduate cohort scored at the 100th percentile against the sophomore comparison group. Overall, the results of the Academic Profile validate the assertion that, as a group, a majority of Rio Salado students are performing at or above and acceptable college level.

In 2002-2003, Rio Salado general education students demonstrated college-level skills on four of the five general education competencies. Students also performed at a higher level than comparable students nationwide on the AP. Although assessment results are not always conclusive, the multiple competency assessment use makes it possible to identify both strengths and potential problem areas for Rio students.

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[1] College level performance is operationalized as a score of 2.75 or above.

Academic Profile Summary

The Academic Profile (AP) was completed by 214 students during the Spring 2003 semester. The AP was divided into 7 sections: humanities, social sciences, natural sciences, college level reading, college level writing, critical thinking, and mathematics. Rio Salado students scored higher, on average, on all sections of the AP than the national comparison sample.[2]

With the exception of the mathematics section, the graduate cohort had the highest score on all sections of the AP. The dual enrollment cohort had the highest score on the mathematics section. There was a positive correlation between cohort membership and scores on the writing and mathematics sections and the total score on the AP. In general, the difference between the group scores on the AP is not statistically significant. However, the difference in scores on the mathematics section is statistically significant, suggesting that cohort membership may have had an impact on mathematics scores.

With the exception of the mathematics section, students in the 41 & over age group had the highest scores on all sections of the AP. There was a negative correlation between age and scores on the following sections: humanities, social sciences, college level reading, critical thinking, and math. The difference in scores between the 18 & under and 19 – 24 age groups and those of the 41 & over age group in humanities, social sciences, natural sciences, college level reading, and critical thinking were statistically significant, suggesting age may have had an impact on these scores. Additionally, the difference in scores on the mathematics section was statistically significant, suggesting that age may have had an impact on mathematics scores.

In general, students had higher average scores in the Spring 2002 semester than in the Spring 2001 or Spring 2003 semesters. However, there was no correlation between the semesters and average total scores. The difference between the 2001 and 2002 total scores was significant which may have been the result of chance or the difference in sample size.

Students were also required to complete a local writing section on the AP. A majority of the students scored at or above college level on this section. There was no correlation found between cohort membership and scores on the local writing section of the AP. However, the dual enrollment cohort had lower scores on the vocabulary choices section than the other two cohorts. This difference in scores on the vocabulary choices section between the dual enrollment and the distance learning and graduate cohorts was statistically significant, suggesting that cohort membership may have influenced scores on this section.

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[2] The Associate of Arts College Freshmen scores were used as the comparison sample for the Rio combined cohort, distance learning cohort, and dual enrollment cohort. The Associate of Arts College Sophomore scores were used as the comparison sample for the graduate cohort. The comparison data was taken from The Academic Profile Comparative Data Guide 1995 – 1999 to ensure valid comparisons across semesters.

There was a correlation between age and scores on both the sentence structure and mechanical errors section and the vocabulary choices section, with scores generally increasing with age. Additionally, the difference in these scores was statistically significant between the 18 & under and the 41 & over age groups, suggesting that age may have had an impact on these two sections.

Overall, students had a lower average total score on the local writing section of the AP in 2001 than in the following two semesters. There was a correlation between total average scores and semester on the local writing section of the AP. The difference was found to be statistically significant, suggesting that student scores may have improved in conjunction with the implementation of the new local writing assessment in 2002.

Writing Competency Summary

The Writing Competency Assessment was completed by 279 Rio Salado students during the Spring 2003 semester. Slightly over two-thirds (68.10%, N = 190) were distance learning students. The vast majority of students (88.53%, N = 247) scored at or above college level on this assessment.[3] The combined cohort student averages were above 3.00 on all sections of the assessment. The distance learning cohort had higher scores than the dual enrollment cohort on the average total scores and on the following four sections: following directions, sufficient content, organization, and vocabulary choices. There was a correlation between cohort membership and both the average total scores and the following four sections: following directions, sufficient content, organization, and vocabulary choices. Further statistical analysis indicated the differences in scores between the cohorts, with the exception of scores on the organization section, were not statistically significant. This suggests that there are variations in scores between the two cohorts, however, cohort membership does not solely account for these differences.

In general, scores increased as age increased. Students' ages were correlated with the total score and on the following sections: sufficient content, organization, sentence structure and mechanical errors, and vocabulary choices. There was a strong correlation between age and vocabulary choices; further analysis indicated that the difference in scores between age groups was statistically significant.[4] This suggests that age does have an impact on students' vocabulary choices.

Students had higher average scores in all sections of the assessment during the Spring 2003 semester than in the Spring 2001 or Spring 2002 semesters. Tests indicate that there is a correlation between the semester and scores. The differences in scores between the Spring 2003 semester and the Spring 2001 and 2002 semesters was statistically significant, suggesting that either students' writing skills improved or another factor contributed to this increase in scores.

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[3] College level performance is operationalized as a score of 2.75 or above.
[4] There was a statistical significance on the vocabulary choices section between the following age groups: 18 & under, 19 – 24 years, 25 – 30 years, and 31 – 40 years.

Writing Competency Coordinator's Outcome Evaluation and Recommendations

Based on the Competency Assessment Report of 2003, I am glad to report that students at Rio Salado are performing at the college level in every aspect of their work, be it related to: following directions, generating sufficient content, demonstrating organization, exhibiting skills in relation to sentence structure, avoiding mechanical errors, and/or exercising accuracy and diversity in their vocabulary choices. Happily, this proves to be the case regardless of age or cohort.

There is even more good news. Scores generally went up in every single area. Such an increase in scores could, as the report notes, actually be due either to the fact that "students' writing skills improved or another factor." The latter includes doubts, for instance, as to whether or not the holistic grading team might be experiencing "grading fatigue" and scoring more leniently overall as a result. I tend not to believe that this is the case, however, as we have had "new blood" in the form of three participants to join the old group over the past year, and "norming" sessions go on as before. I'd prefer to think that our students are just becoming better writers overall and that we are attracting better students. Even so, just to test this other theory, we will be running a few old essays through the team again to see whether or not they will be scored higher the second time around.

The assessment results suggest a strong correlation between writing competency and age. Students' scores in the report tended to increase with their years up until the age of 41, at which point they leveled off and even declined slightly. This likely reflects the extent to which various age groups are immersed in the assessment culture of higher education. Younger students, though full of energy, enthusiasm, and diverse interests, simply lack the experience of their middle-aged counterparts, and probably do much better at the multiple choice tests they have come to know in standardized testing. That lack of experience or maturity is reflected most clearly in their relative difficulty at reining in and organizing their ideas into an essay format. Gradually, though, older students start to belong to a group that is returning to an academic environment after having been out of it for a significant number of years. Their scores on the writing competency start, at this point, to decline slightly.

Interestingly, for the first time in recent assessment history, distance education students outscored dual enrollment students across the board. This outcome ran counter to our expectations, based on previous scores, that college-bound high school juniors and seniors tend to be higher academic achievers than students returning to school from the workforce. It partially reflects changes in our placement procedures. Over the past year we have been running a pilot in terms of admission to dual enrollment based on Accuplacer. We vacillated as to whether to make the cut-off score either a 7 or 8 for ENG101 and ultimately opted for the lower of the scores. Even though this decision resulted in more students being admitted into the program than could have enrolled otherwise, the scores indicate that academic integrity was not compromised and that dual enrollment cohorts are still performing at a college level, albeit a slightly lower one.

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We seem to be on the right course in terms of improving writing competency at Rio Salado. At this point the College would probably best benefit from the continued insertion across the curriculum of grading rubrics and learning objects related to writing.

Reading Competency Summary

The Reading Competency Assessment was completed by 443 students during the Spring 2003 semester. With the exception of the skill selection average score, the dual enrollment cohort had higher scores on the Reading Competency than the distance learning cohort. There was a correlation between cohort and scores on the skill selection portion of the assessment and the difference between scores was significant, which suggests that cohort membership may have had an impact on the scores on this section.

Students who were 41 years or over had the highest total score on the Reading Assessment. However, these students did not have the highest scores on all sections. There was some significance between the differences in scores on two sections of the assessment.[5] However, no correlation was found between age and scores on the Reading Competency, which suggests that the difference in scores may have been due to chance or other variables.

In general, scores did not vary greatly across the years 2001, 2002, and 2003. Students had the highest average total score in 20032 (Average = 3.11, N = 443). There was a correlation between the semester and scores on the skill selection and the analysis skills sections and the total scores. The difference in scores on these two sections and the total average was significant between the Spring 2001 and Spring 2003 semesters. Students had higher average scores on all sections of the assessment during Spring 2001, however, students had a higher total average in the Spring of 2003. These differences may have been caused by the difference in cohort size. There was a correlation between semester and total scores for the dual enrollment cohort. Students had a higher average total in Spring 2003. This difference in scores was statistically significant, suggesting that the semester that the assessment was completed in may have been a factor in the scores. There were fewer dual enrollment students who completed the assessment during the Spring 2003, which may also have influenced scores.

Reading Competency Coordinator's Outcome Analysis and Recommendations:

Rio students continued to be assessed on the reading competency during the 2002-03 academic year. This provided the college with three years of longitudinal data from the same instrument. Work in the 2002-03 academic year was focused on continued collection of data, clarifying the data from the instrument by categorizing the data into four major skills categories, discussion of interpretation and analysis of specific reading

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[5] A significant difference was found between scores on the skill selection section between the 18 and under age group and both the 19 – 24 and 25 – 30 age groups. A significant difference was found between scores on the analysis skills between the 19 – 24 age group and both the 31 – 40 and 41 and over age groups.

skills in the four categories of college level reading with Reading adjunct faculty, and design and implementation of interventions.

The median score for all groups of Rio students taking the Reading Competency assessment in 2002-03 is 3.11, indicating that Rio Salado students continue to demonstrate having the skills to read at the level expected in college, which is what the longitudinal data indicates.

New data categories this year included the summary of reading data by categories: Skill selection, identification skills, analysis skills, and independent reading skills. These data showed that students' use of independent reading skills is their lowest skill category and this therefore needs direct attention in the 2003-04 academic years. The Reading Competency skills list by category follows this report.

Reading faculty members continue to see the same patterns of student behavior for the use of their reading skills as they have in the past. Anecdotal data from faculty in Gen Ed disciplines other than Reading indicates that most students are likely to demonstrate college level reading skills at times at critical points in the coursework, for example, when a high percentage of grade points are given for exams. However, it takes time to consciously apply college level reading skills and many students rush their reading activities and admit to not giving themselves enough time to do more than skim their reading assignments. Students who are rushed use fewer skills and use lower level skills. Messages from students continue to indicate that they are very stressed for time as they work on their General Education college courses. They state that they rarely take the time to think about "how" they are doing their work (self-assess) or review their work to see if they are doing work at the level they are capable of.

The intervention focus for the 2002-03 academic year was based on the discussion that some students may not realize the importance of consciously and independently using specific reading skills and even increasing their use of different reading skills so that they can increase their learning and transfer their learning.

Qualitative data from adjunct faculty in the past indicate that students needed to be directly told to use college level skills; that if they are not asked or directed to do so they may, in fact, not put the effort into their reading that they need to. Therefore, the intervention strategy that was piloted in the Spring semester was to insert the following statement into approximately eight distance learning courses, where students were directed to read a textbook chapter:

- Study-Read Chapter x: "title"

  It is expected that you will use **college level study-reading skills** for this work. This includes previewing the chapter, identifying and defining key vocabulary words, taking notes on key concepts, and organizing and summarizing important information to help you understand, learn, and remember this information.

Five faculty members reported that several students asked questions specifically about the directions that told student to study read. These students asked about the best methods for notetaking and how to preview a chapter. Based on this initial work and on this feedback, interventions in the 2003-04 academic year will include links to an on-line resource for adjunct faculty and for students.

The faculty members in the pilot believe that the curriculum needs to explicitly emphasize study reading as a skills set that is important to good teaching and learning. They state that students should be told that they need to use specific study reading skills and they will do what they are told.

Plans for the 2003-04 academic year include working with more Faculty Chairs to consider integrating the intervention statements about expectations for the use of college levels reading skills and about the specific use of study reading skills into course syllabi and course materials.

2002-03

Reading Competency Skills list

(based on the numbering of the questions in the internally developed competency assessment instrument)

In order to increase comprehension, the student demonstrates that he or she can:

1. select reading skills based on purpose and type of written material
2. select reading skills based on the purpose of persuasion
3. analyze written materials for main idea
4. analyze written materials for blocks to comprehension
5. identify organizational patterns in written materials
6. identify bias in written materials
7. identify tone in written materials
8. identify purpose of language adaptations
9. identify meaning through context clues
10. identify assertion as support in written materials
11. analyze the logic of the writer's ideas
12. identify various kinds of support in written materials
13. analyze figurative language devices
14. identify citations as support in written materials
15. analyze the title as a langue device
16. identify examples as support in written materials
17. independently applies specific study skills
18. independently uses specific critical reading techniques for the reading task
19. independently vary the use of critical reading techniques
20. independently analyzes the selection of critical reading techniques applied to written materials

Skill Groups:

Skill selection:
1. select reading skills based on purpose and type of written material
2. select reading skills based on the purpose of persuasion

Identification skills:
5. identify organizational patterns in written materials
6. identify bias in written materials
7. identify tone in written materials
8. identify purpose of language adaptations
9. identify meaning through context clues
10. identify assertion as support in written materials
12. identify various kinds of support in written materials
14. identify citations as support in written materials
16. identify examples as support in written materials

Analysis skills:
3. analyze written materials for main idea
4. analyze written materials for blocks to comprehension
11. analyze the logic of the writer's ideas
13. analyze figurative language devices
15. analyze the title as a langue device

Independent reading skills:
17. independently applies specific study skills
18. independently uses specific critical reading techniques for the reading task
19. independently vary the use of critical reading techniques
20. independently analyzes the selection of critical reading techniques applied to written materials

Critical Thinking Summary
The Critical Thinking Competency Assessment was completed by 441 students during the Spring 2003 semester. The distance learning cohort scored higher than the dual enrollment cohort on all sections of this assessment. There was a correlation between cohort and scores on the total score of the Critical Thinking Assessment and on all sections, with the exception of the analysis section. The difference between these scores is statistically significant, suggesting that cohort membership may influence scores.

There was a correlation between age and scores on all sections of the assessment. In general, students who were 25 or older had higher average scores than students who were 24 or younger. The difference in average scores between students who were 18 and

under or 19 – 24 and the scores of the other students was, in general, statistically significant. This suggests that age may also have an influence on scores.

In general, scores did not vary greatly across the years 2001, 2002, and 2003, suggesting consistent performance across time. There was no correlation between the semester and scores. Although there were some statistically significant difference in some scores over the semester, the lack of a correlation indicates that chance or cohort size may have had an impact on scores.

Critical Thinking Competency Coordinator's Outcome Evaluation and Recommendations

I.   Summary of Outcomes

The Test of Everyday Reasoning—Analysis

Distance learning and dual enrollment combined cohort scores resulted in the highest percentile scores for inference and analysis, both above the 70th percentile. The lowest score, at the 59th percentile, was in inductive reasoning. All five critical thinking component skill areas were above the 50th percentile range, from 59.46 at a low to 72.71 at a high. The average percentile for all skill areas was 62.45. When breaking apart the cohorts, the distance learning students significantly outscored the dual enrollment students in all areas. The distance learning students scored lowest in evaluation at the 67th percentile. Overall, the percentile for all skill areas was 69.22. On a national average, then, Rio Salado College distance learning students did a commendable job of demonstrating critical thinking—scoring well above the 50th percentile in all five skill areas.

By comparison, the dual enrollment students scored lowest in inductive reasoning at close to the 44th percentile. The significantly lowest score in this area led to an overall percentile score of 49.10. In the other four skill areas, though, the dual enrollment students ranged from the 50th to the 60th percentiles. Lower dual enrollment scores on all component critical thinking skills of this test can be attributable to how the students are educated in terms of building foundational skills, expectations (a great deal of memorization of information at this age and just beginning to develop heightened use of critical thinking components), and age/maturity. A direct correlation can be made between age/maturity and critical thinking utilization/application.

This correlation is substantiated by the statistics. Those students ages 18 and under scored under the 50th percentile in two component areas, inductive reasoning at close to the 44th percentile and inference at the 46th percentile. Overall, the percentile for all skill areas was 49.10. All other age groups scored significantly above the 50th percentile. Those students ages 19-24 scored 62.45 overall, with a low of close to the 51st percentile in analysis and a high in evaluation at the 67th percentile. Those students in age groups 25-30, 31-40, and 41-over scored at the 74th percentile overall on the component skills. They all scored lowest in inductive reasoning at close to the 69th percentile and highest in

evaluation at close to the 81st percentile. Clearly, then, those students ages 25 and up are demonstrating strong critical thinking skills, particularly when compared to the national norm.

On a longitudinal basis, overall component critical thinking skill scores have remained consistent during 2001, 2002, and 2003. The mean was identical, 2.78, for combined cohorts in 2001 and 2003. It dipped slightly to 2.66 in 2002. When breaking apart the cohorts, the distance learning students scored nearly identical in 2001 and 2003, with 2.89 as the mean in 2001 and 2.85 as the mean in 2003. In 2002, the mean was 2.76. For dual enrollment students, the mean was a high of 2.61 in 2001 and a low of 2.48 in 2002. The mean in 2003 was 2.55. Longitudinally, then, the mean scores have been constant. It is important to know that although the critical thinking tool, *The Test of Everyday Reasoning*, separates in its assessment and scoring five distinct critical thinking skills, these skill areas overlap, interact, and mutually reinforce each other. Considering the higher order cognitive skills required with critical thinking, and considering that Rio Salado largely services students who take courses "piecemeal" as well as those who attend other college(s), the consistent critical thinking scores across the years are commendable.

II.   Improvements/Interventions for 2002-03

- Critical thinking workshops for instructors conducted by Thomas Lombardo at the college level and experts such as Richard Paul at the district level.
- eCheating/plagiarism workshops for instructors conducted by Janine Adkins and Willie Minor (business faculty chair) at the college level.
- Dissemination of critical thinking information to faculty chairs and instructors to better educate instructors about critical thinking. Information is provided in-person and online.
- Develop of critical thinking definition and rubric at the college level, provided in materials and posted online.
- Improvements made in assignment development (e.g., to create more reflective assignments with a steady development and utilization of critical thinking components). Course developers and faculty chairs are provided with information and given guidance in this regards.
- Improvements made in grading criteria across academic disciplines (e.g., clear expectations provided for critical evaluation of course material, specific amount of points awarded for demonstration of critical evaluation).
- Instructors make appropriate recommendations for students to consult with qualified writing and/or reading tutors who can contribute to enhanced reasoning capacities, help students better understand assignment directions and organize thoughts, and the like.

III.   New Improvements/Interventions for the Fall 2003 Semester

- Development of online critical thinking workshop for instructors, developed by Thomas Lombardo

- Development of online critical thinking workshop for students, developed by Thomas Lombardo
- Development of online eCheating/plagiarism workshop for instructors, developed by Janine Adkins. When students do not possess requisite critical thinking skills, for instance, cheating is often resorted to and the method of choice is most often plagiarism. This workshop points out problem areas and how to help students avoid them.
- Work with dual enrollment instructors, in particular, to make improvements in delivery of material and assignment development. The goal is to see incremental changes in the critical thinking outcomes for dual enrollment students. This is expected to remain a challenge since critical thinking mastery is tied, in part, to maturity.

Information Literacy Summary

The Information Literacy Competency Assessment was completed by 463 students during the Spring 2003 semester. The distance learning cohort had higher scores than the dual enrollment cohort on both the developing search strategies and evaluating information sections and on the average total score. There was a correlation between cohort membership on these two sections and on the average total score. Additionally, the differences in scores on these two sections and on the average total score were statistically significant, suggesting that cohort membership may have impacted these scores.

With the exception of the identifying information section, students 41 and over had the highest scores on the assessment. There was a slight correlation between ages and scores on developing search strategy, evaluating information, and the total score on this assessment. The difference between scores was occasionally statistically significant, suggesting that age may have had an impact on scores.[6]

In general, scores on this assessment did not vary greatly between the Fall 2001, Spring 2002, and Spring 2003 semesters.[7] A correlation was found between the semester and the scores on two sections of the Information Literacy Assessment, developing search strategies and evaluating information for all students. In general, scores on these two sections were lower in the Spring 2002 semester. The difference in scores was statistically significant between the semesters, suggesting that a factor in at least one of the semesters may have had an impact on student scores.

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[6] The difference in average scores on the identifying information section was not statistically significant.
[7] Dual enrollment students only completed the Information Literacy assessment during the Spring 2002 and Spring 2003 semesters.

Information Literacy Competency Coordinator's Outcome Analysis and Recommendations

History of the Information Literacy Competency

Information literacy was added to the slate of college-wide competencies at Rio Salado College for the 2000-2001 school year. Because no tested, standardized instrument to measure Information Literacy was located, an instrument was developed in-house.

The instrument was administered to a pilot group of distance learning students in the Spring 2001 semester (N=134). The overall mean was 3.40, with a standard deviation of 0.21. The extremely high scores achieved in all sections of the instrument were very surprising; however, it was felt that the instrument was appropriately rigorous, having been developed and reviewed with input from several librarians.

The instrument was slightly revised before being administered again during the Fall 2001 semester. Additional questions were added, and some language in existing questions was modified, to provide for more even testing across the four subsections. The resultant instrument was slightly more rigorous than the pilot version. Again, the instrument was administered only to distance learning students, although to a larger group (N=260). A comparison of the data gathered in Fall 2001 with Spring 2001 showed essentially the same result, with students scoring at high levels across all subsections of the instrument. The overall mean once again was 3.40, with a standard deviation of 0.21.

In Spring 2002, the information literacy competency was incorporated with the other core competencies at the college and tested across a broader population of students, both distance and in-person, with a considerably higher N than either of the two previous semesters (N=541). Despite the wide range in age of the students, the range in the number of general education credits completed by students who took the assessment, and the mixed delivery modalities in which the students were enrolled, the results were once again substantially the same. The overall mean was 3.32, with a standard deviation of 0.21. Students scored extremely well across all subsections of the competency instrument. In the "Identifying Information" subsection, the mean was 3.20 with a standard deviation of 0.37. "Developing Search Strategies" had the highest mean of 3.50, with a standard deviation of 0.29, while "Evaluating Information" had a mean of 3.17 with a standard deviation of 0.39. Finally, the "Applying Information" subsection had a mean of 3.33, with a standard deviation of 0.33.

Current Data
The same instrument was administered in Spring 2003 to cohorts of distance learning students (N=350) and dual enrollment students (N=113). Once again, scores were extremely high, showing 98.7% of students performing at College Level. The overall mean was 3.37, with a standard deviation of 0.23. Students scored extremely well across all subsections of the competency instrument. In the "Identifying Information" subsection, the mean was 3.22 with a standard deviation of 0.38. "Developing Search Strategies" had the highest mean of 3.52, with a standard deviation of 0.28, while

"Evaluating Information" had a mean of 3.25 with a standard deviation of 0.44. Finally, the "Applying Information" subsection had a mean of 3.42, with a standard deviation of 0.23.

Future Directions.
There has been very little difference in scores in the years since the information literacy instrument was implemented. Students across cohorts and across age groups have show an extremely high proficiency with the information literacy instrument.

Given this data, plans for the next year will include some investigation of transfer and application of information literacy skills. The direction for this work will therefore focus less on testing students for competence, and more on integrating these skills into the curriculum and working with the adjunct faculty.

Problem Solving Summary

The Problem Solving Competency Assessment was completed by 559 students during the Spring 2003 semester. In general, students scored above college level on the Problem Solving Assessment (91.23%, N = 510). Distance learning students had higher scores on both the metacognition and motivation sections of the assessment than dual enrollment students. The differences in scores on the metacognition section was statistically significant, suggesting cohort membership may have influenced scores.

In general, scores on the Problem Solving Assessment increased as age increased. Students who were 41 and above had the highest average scores on both sections of the assessment. There was a correlation between age and scores on both the metacognition and motivation sections of the assessment. The differences between average scores and ages was generally significant, suggesting that age may have influenced scores.

Overall, student scores did not vary greatly across the years 2001, 2002, and 2003, suggesting consistent performance across time. There was a correlation between the score on motivation and semesters for all students. The difference in motivation scores was statistically significant between the 2001 and 2003 semesters. This may have been due to chance or the difference in cohort size.

Problem Solving Competency Coordinator's Outcome Analysis and Recommendations

An analysis of the current data on problem solving reveals that over 91% of the cohort assessed performs at the college level on the skills measured. Longitudinal statistics indicate that the means in all areas have remained relatively stable. In fact, both measures (metacognition and motivation) have risen slightly in the 20032 study from the previous year and each is at its highest level for the three years of reporting.

This is a positive finding and an encouraging measure of our cohort and its abilities. There are a few noteworthy observations about the data:

- Metacognition and motivation scores are measurable higher in distance learning students than in dual enrollment students. More to the point, the scores rise proportionately with age groups. One conclusion certainly is that such skills naturally improve with age and experience. The temptation is to conclude as well that they can be little affected by direct interventions. However, the skills measured here (planning, self-checking, effort and self-efficacy) are in good part a function of habit, and while experience might hone such habits, they may also prove responsive to curricular tasks that promote or require such activities.

- The metacognition means were uniformly lower than the motivation means. Whether this is an idiosyncrasy of the instrument or an indicator of some real difference is unknown. However, it is also noted that that the differences between metacognition and motivation score were more pronounced in the younger age levels.

While the data suggests that the cohort is performing at a high level and predominantly performing at a college level, there are still some potential target areas for improvement:

- Promoting both metacognition and motivation in our dual enrollment students. By working with our dual enrollment faculty, we can promote more thorough problem solving habits and more frequent opportunities to exercise and develop these habits. Promoting metacognition especially through structured planning and self-checking in course work would have a positive effect on this. It is not too risky to propose that many of the 9% of the cohort that fell below college level problem solving skills were among the dual enrollment cohort. Such efforts would have a direct effect on this number.

- In our distance learning classes, problem solving can still be promoted using similar strategies to those employed in dual classes. Structured learning experiences and regular exhortation to apply the skills of problem solving stand to improve what are already very impressive scores.